independent behavior over a temperature range from ambient to physiological temperatures.

EXAMPLE 6

The current transient was measured for a test strip prepared in accordance with Example 2 and for a commercial test strip made with a carbon-containing ink. The results are shown in FIGS. 8A and 8B. As shown, the test strip of the invention (FIG. 8A) provides a very flat transient which maintains more than 50% of the peak current for a period of more than 25 seconds after the initial response from the test strip. In contrast, the carbon-based electrode exhibited an almost immediate decay in the current, having lost 50% of the peak current in a period of the first 1 to 2 seconds after the initial response from the test strip. This makes timing of the measurement difficult if peak current values are to be captured, or reduces the dynamic range of the meter is currents must be measrured after substantial decay has occurred. Thus, the test strips of the invention are advantageous in that they provide test strips in which the amount of current generated in response to a given amount of glucose decays by less than 50% in the 5 seconds following peak current generation.

We claim:

1. A disposable glucose test strip for use in a test meter of the type which receives a disposable test strip and a sample of blood from a patient and performs an electrochemical analysis of the amount of glucose in the sample, comprising:

(a) a substrate;

(b) a reference electrode;

(c) a working electrode, said working electrode comprising a conductive base layer disposed on the substrate and a first working coating disposed over the conductive base layer, said first working coating comprising a filler having both hydrophobic and hydrophilic surface regions such that it forms a network upon drying, an enzyme effective to oxidize glucose, and a mediator effective to transfer electrons from the enzyme to the conductive base layer; and

(d) means for making an electrical connection between the reference and working electrode and a glucose test meter.

2. The test strip of claim 1, wherein the working layer is non-conductive.

3. The test strip of claim 2, wherein the filler is silica.

4. The test strip of claim 3, wherein the conductive base layer comprises conductive carbon.

5. The test strip of claim 3, wherein the enzyme is glucose oxidase.

6. The test strip according to claim 3, wherein the mediator is ferricyanide.

7. The test strip of claim 3, wherein the first working layer is formed from an aqueous composition comprising weight 2 to 10% by weight of a binder 3 to 10% by weight of silica; 8 to 20% by weight of a mediator; and 1000 to 5000 units per gram of the aqueous composition of an enzyme for oxidizing glucose.

8. The test strip of claim 3, wherein the silica is a silica which has been modified by partial surface treatment with methyl dichlorosilane.

9. The test strip of claim 8, wherein the conductive base layer comprises conductive carbon.

10. The test strip of claim 8, wherein the enzyme is glucose oxidase.

11. The test strip of claim 8, wherein the mediator is ferricyanide.

12. The test strip of claim 8, wherein the first working layer is formed from an aqueous composition comprising weight 2 to 10% by weight of a binder 3 to 10% by weight of silica; 8 to 20% by weight of a mediator; and 1000 to 5000 units per gram of the aqueous composition of an enzyme for oxidizing glucose.

13. The test strip of claim 3, further comprising a second working layer comprising silica, a binder and a mediator but no glucose-oxidizing enzyme.

14. The test strip of claim 3, further comprising a second working layer comprising silica and a binder but no glucose-oxidizing enzyme.

15. The test strip of claim 1, further comprising a second working layer comprising a filler, a binder and a mediator but no glucose-oxidizing enzyme.

16. The test strip of claim 1, further comprising a second working layer comprising a filler and a binder but no glucose-oxidizing enzyme.

17. An aqueous composition comprising a binder, a silica filler having both hydrophobic and hydrophilic surface regions, at least one of an enzyme effective to oxidize glucose and an electron transfer mediator.

18. The composition of claim 17, wherein the filler is non-conductive.

19. An aqueous composition comprising 2 to 10% by weight of a binder; 3 to 10% by weight of silica; 8 to 20% by weight of a mediator; and 1000 to 5000 units per gram of the aqueous composition of an enzyme for oxidizing glucose.

20. The composition of claim 19, wherein the silica has both hydrophobic and hydrophilic surface regions.

21. The composition of claim 20, wherein the binder is hydroxyethylcellulose.

22. The composition of claim 19, wherein the enzyme is glucose oxidase.

23. The composition of claim 19, wherein the mediator is ferricyanide.

24. A method for making a disposable test strip for the electrochemical detection of glucose, comprising the steps of:

(a) applying working and reference electrode tracks to a substrate;

(b) applying a conductive base layer in contact with the working electrode track; and

(c) applying a working layer over the conductive base layer, wherein the working layer comprising a filler having both hydrophobic and hydrophilic surface regions such that it forms a network upon drying, an enzyme effective to oxidize glucose, and a mediator effective to transfer electrons from the enzyme to the conductive base layer.

25. The method of claim 24, wherein the filler is non-conductive.

26. The method of claim 25, wherein the filler is silica.

27. The method of claim 26, wherein the conductive base layer comprises conductive carbon.

28. The method of claim 26, wherein the enzyme is glucose oxidase.

29. The method of claim 26, wherein the mediator is ferricyanide.

30. The method of claim 26, wherein the first working layer is formed from an aqueous composition comprising weight 2 to 10% by weight of a binder 3 to 10% by weight of silica; 8 to 20% by weight of a mediator; and 1000 to 5000 units per gram of the aqueous composition of an enzyme for oxidizing glucose.

31. The method of claim 30, wherein the silica is a silica which has been modified by partial surface treatment with methyl dichlorosilane.